

EXTRA-CORPOREAL MEMBRANE OXYGENATION TRAINING SIMULATOR

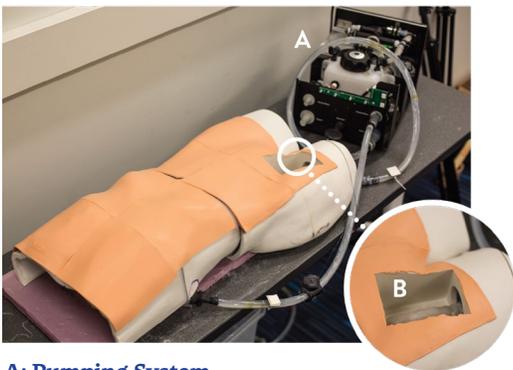
OPPORTUNITY FOR NEW TRAINING DEVICE

Extra-Corporeal Membrane Oxygenation (ECMO) is a practice that surgeons use to provide artificial oxygenation to blood cells in case of a failing heart and/or lungs during surgery. ECMO uses a pump to circulate blood through an artificial lung back into the bloodstream of a patient. Improvements to the heart-lung bypass support have resulted in growing use of this technique.

The skill is difficult to perfect without practicing on real patients and there are no simulation platforms to help train physicians on the fundamental steps of access, cannulation, and connection to ECMO. We have created a simulator to help surgeons perfect this difficult skill without practicing on real patients. Honing this skill will lead to better patient outcomes.

OUTCOME AND FEATURES

With the help of a grant from Jump ARCHES, an OSF innovation program, we have developed the ECMO Training Simulator to aid in the quick deployment of this procedure for a failing heart and/or lungs:



A: Pumping System

B: Flexible Vasculature - includes replacement for repeated cannulation

- Simulator includes a customized mannequin with underlying tissue-like vasculature that can be used to practice cannulation (monitor flashback of blood), stent replacement, and other endovascular procedures such as angiogram/angioplasty.
- Simulator can be scanned using ultrasound or x-ray, permitting trainees to acquire or improve the skills required to perform ECMO.
- Task trainer is controlled by a software model of human physiology, which can simulate various conditions during a surgery and ECMO.
- Device includes a lifelike blood simulant that is circulated through the vasculature by means of a pumping system. The substance contains pigments that change color from deep red to simulate impure blood to lighter red to simulate oxygenated blood.

ADVANCING SIMULATION

WHO WE ARE



HEALTH CARE ENGINEERING SYSTEMS CENTER (HCESC)

AT THE UNIVERSITY OF ILLINOIS AT URBANA CHAMPAIGN

HCESC provides clinical immersion and fosters collaboration between engineers and physicians. We use our expertise in broad areas of simulation technologies, smart health systems, data analytics, human factors, and medical robotics to design and develop collaborative solutions that improve healthcare outcomes. Our innovative partnership with Jump Simulation of OSF HealthCare in Peoria, Illinois is known as Applied Research for Community Health through Engineering and Simulation (ARCHES).

JUMP ARCHES

Jump ARCHES (Applied Research for Community Health through Engineering and Simulation), a collaborative effort between the University of Illinois College of Engineering and University of Illinois College of Medicine at Peoria focuses on providing solutions to the biggest problems in healthcare. Jump ARCHES supports select teams of clinicians and engineers working together to develop new tools that enhance clinical outcomes at OSF and medical education at facilities like Jump.



For more information on this program and other Jump ARCHES projects, visit <https://healtheng.illinois.edu/research/focus/simulation/ecmo/> or contact:

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